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**CDC® 18001-1/2  
DATA CHANNEL CONVERTER**

**GENERAL DESCRIPTION  
OPERATION AND PROGRAMMING**

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## REVISION RECORD

**REVISION LETTERS I, O, Q, S, X AND Z ARE NOT USED.**

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## PREFACE

This manual provides hardware reference information for the CONTROL DATA® 18001-1/2 Data Channel Converter. The manual is written for programmers, operators, and customer engineers who work with the data channel converter.

### OCTAL CONVENTION

Unless otherwise indicated, all function codes and connect codes used in this manual are octal.

### INSTRUCTION MNEMONICS

Peripheral processor instruction mnemonics used in this manual are from the COMPASS assembly language.

### RELATED MANUAL

Refer to the DC405 Data Channel Converter Hardware Maintenance Manual, publication number 60459100, for installation, theory, diagrams, and maintenance information.

### DISCLAIMER

The data channel converter is intended for use only as described in this manual. Control Data cannot be

responsible for the proper functioning of undescribed function codes.

### RADIATION WARNING

The following warning applies to this equipment.

**WARNING**

This equipment generates, uses and can radiate radio frequency energy and if not installed and used in accordance with the instructions manual, will cause interference to radio communications. This equipment has been tested with a class A computing device and has been found to comply with Part 15 of the FCC Rules which are designed to provide reasonable protection against such interference. Operation of this equipment in a residential area may cause unacceptable interference in which case the user at his own expense will be required to take whatever measures may be required to correct the interference.



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The CDC® 18001-1/2 Data Channel Converter (figure 1-1) is a table-top device that allows CDC 3000 Series peripheral controllers and units (3000 equipment) to be attached to a 1-MHz data channel from a CDC 6000 Series, CDC CYBER 70 Series, or CDC CYBER 170 Series computer. In this manual, the data channel from the computer is called a CYBER channel and the data channel between the converter and the 3000 equipment is called a 3000 channel.

## FUNCTIONAL DESCRIPTION

Figure 1-2 shows the environment in which the converter operates. When the converter is selected, it enables conversion hardware that links the CYBER channel with a 3000 channel.

A peripheral processor (PP) normally selects the converter by issuing unique function codes on the CYBER channel. The converter attached to a CYBER channel is automatically selected at deadstart time. Although both the CYBER channel and the 3000 channel are 12-bit, bidirectional channels, they differ in transmission technique, number and type of control

signals, and input/output conventions. The CYBER channel uses a synchronous pulsed transmission method, while the 3000 channel uses an asynchronous, voltage level transmission method that allows all equipments to be attached physically to the same lines.

Several signals on the 3000 channel have no counterparts on the CYBER channel. The converter provides a status function to make some of these signals available to the PP.

### CYBER CHANNEL

Figure 1-3 shows CYBER channel signals.

#### NOTE

CYBER channels from some computers do not have a parity bit in either direction. A switch on the converter disables parity to allow converter use on these channels.

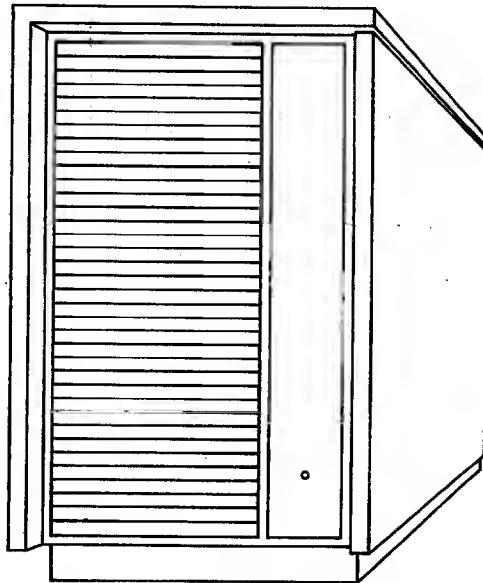


Figure 1-1. Data Channel Converter

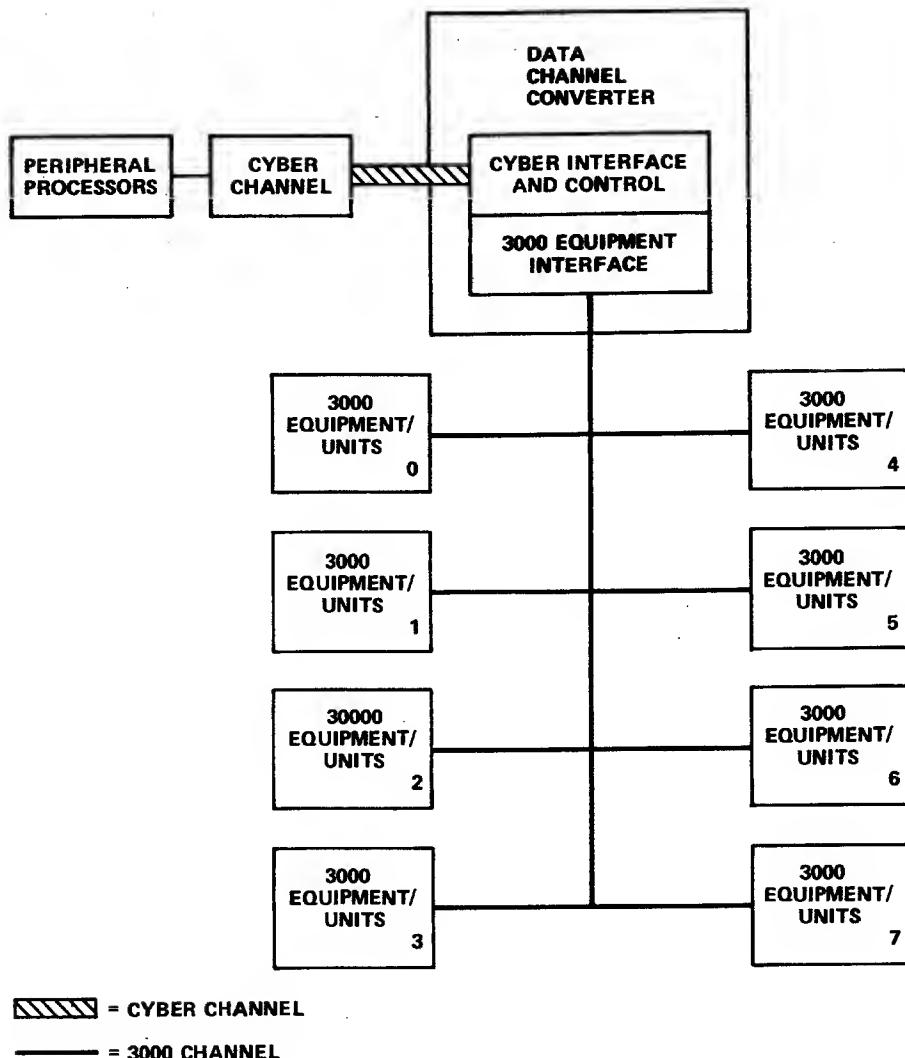


Figure 1-2. Data Channel Converter Environment

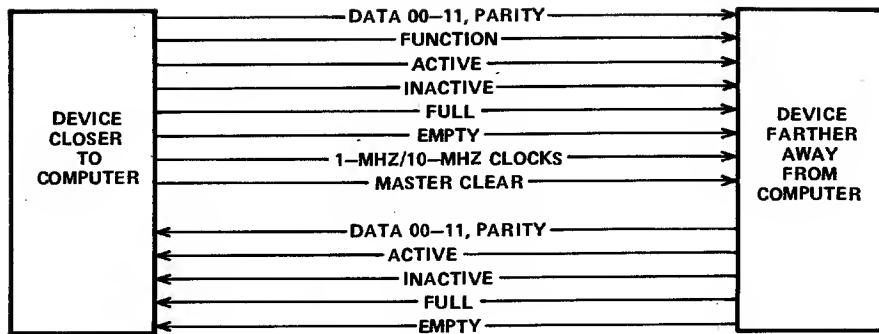


Figure 1-3. CYBER Channel

The CYBER channel consists of 13 data/parity lines in either direction plus the following control signals:

<u>Signal</u>	<u>Description</u>
Function	Indicates that the word present on the CYBER channel is a function code.
Active	Indicates that the CYBER channel is ready to transfer data.
Inactive	Indicates that a data transfer is terminated or that a function code has been accepted.
Full	Indicates that a word is present on the CYBER channel.
Empty	Indicates that a word has been removed from the CYBER channel.
1-MHz/10-MHz Clocks	Synchronize the converter and other CYBER peripheral equipment with the computer.
Master Clear	Occurs every few milliseconds during the first portion of a computer deadstart sequence.

Activities on the CYBER channel can be divided into two basic groups.

- Function issuing operations
- Data transfer operations

A function issuing operation transfers a function code from the PP to the converter or another device on the CYBER channel. A data transfer operation moves data to or from the PP on the CYBER channel, with the direction of the transfer determined by a function issued just before the transfer.

To issue a function, the PP executes an FAN or FNC instruction that sends Data/Parity (containing the function code) and Function to the converter. To reply to the function, the converter sends Inactive to the PP.

To perform an input data transfer operation, the PP executes an ACN instruction that sends Active to the converter. The converter then sends Data/Parity and Full and the PP automatically responds with Empty after receiving the data word. This Empty causes the converter to send the next word, and the process continues until either the PP or the converter sends Inactive.

To perform an output data transfer operation, the PP executes ACN and OAM or OAN instructions that send Active, Data/Parity, and Full to the converter. After receiving the data word, the converter responds with Empty. This Empty causes the PP to send the next word, and the process continues until the PP sends Inactive.

### 3000 CHANNEL

Figure 1-4 shows the 3000 channel. This channel consists of 13 bidirectional data/parity lines and the following control signals:

<u>Signal</u>	<u>Description</u>
Connect	Indicates that the word on the data lines is a connect code.
Function	Indicates that the word on the data lines is a function code.
Read	Indicates that a computer input data transfer is in process.
Write	Indicates that a computer output data transfer is in process.
Channel Busy	Indicates that an input or output data transfer is in process.
Word Mark	Accompanies Data Signal but occurs 100 nanoseconds earlier.

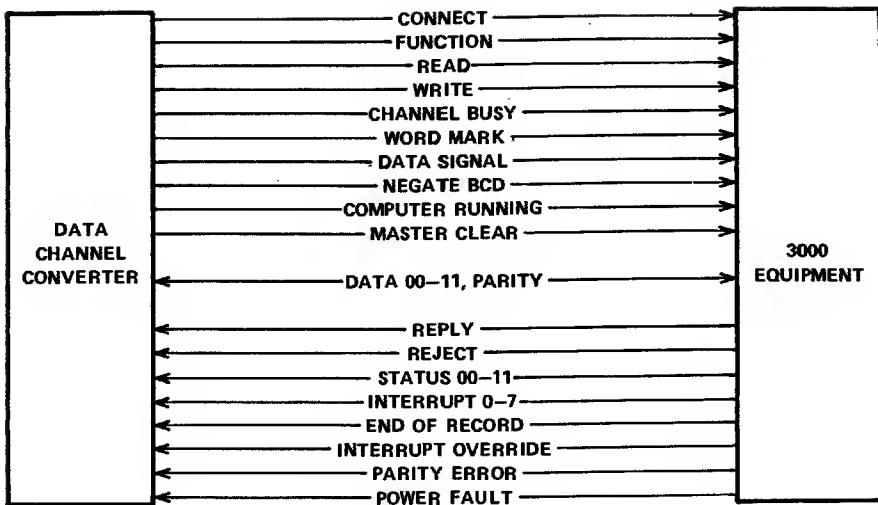


Figure 1-4. 3000 Channel

<u>Signal</u>	<u>Description</u>	<u>Signal</u>	<u>Description</u>
Data Signal	Indicates that the 3000 equipment can send a word (computer input operation) or accept a word (computer output operation).		been blocked. This signal is normally unused in the CYBER environment.
Negate BCD	Disables internal-to-external BCD conversion in the 3000 equipment.	Parity Error	Indicates parity calculated by the connected 3000 equipment did not agree with parity sent by the converter.
Computer Running	Indicates that the converter is selected by the PP.	Power Fault	Indicates that the connected 3000 equipment has abnormally lost power.
Master Clear	Clears all 3000 equipments attached to this channel.	Activities on the 3000 channel can be divided into three basic groups.	
Reply	Indicates acceptance of a connect code, function code, or data word by a 3000 equipment.	<ul style="list-style-type: none"> <li>• Connect operations</li> <li>• Function issuing operations</li> <li>• Data transfer operations</li> </ul>	
Reject	Indicates rejection of a connect code, function code, or data word by a 3000 equipment.	A connect operation selects one of the equipments on the 3000 channel for function or data transfer operations. A function issuing operation transfers a function code to the connected equipment. A data transfer operation moves data to or from the connected equipment, with the direction of the transfer determined by the function codes issued before the transfer.	
Status 00 through 11	Twelve signals that form a 3000 equipment status code.	When performing a connect or function issuing operation, the converter expects the 3000 equipment to respond to each Connect or Function with either Reply or Reject. If the equipment fails to send either Reply or Reject within 100 microseconds, the converter generates Internal Reject status and proceeds as though the equipment had sent Reject.	
Interrupt 0 through 7	Eight lines (one from each possible 3000 equipment) that provide interrupt status to the converter.	To connect an equipment, the converter sends Data/Parity (containing a connect code) and Connect to all equipments on the 3000 channel. The equipment whose equipment number agrees with the	
End-of-Record (EOR)	Indicates a break in the flow of computer input data from the 3000 equipment.		
Interrupt Override	Indicates that the connected 3000 equipment has generated an abnormal end-of-operation interrupt, even though interrupts from the equipment have		

connect code responds with Reply or Reject and all other equipments disconnect. Once connected, an equipment can perform function and data transfer operations and also provide equipment status and interrupt status to the converter. Unconnected equipments are able to respond only to connect operations and provide only interrupt status to the converter.

To issue a function, the converter sends Data/Parity (containing a function code) and Function on the 3000 channel and the connected equipment responds with either Reply or Reject.

To perform an input data transfer operation, the converter raises Read and Channel Busy and sends Word Mark and Data Signal to the connected equipment. The connected equipment responds with Data/Parity and Reply. This process continues until the converter drops Read and Channel Busy, until the equipment sends end-of-record, or until the equipment sends Reject or fails to send Reply.

To perform an output data transfer operation, the converter raises Write and Channel Busy and sends Data/Parity, Word Mark, and Data Signal to the connected equipment. The equipment responds with Reply, and the process continues until the converter drops Write and Channel Busy, or until the equipment sends Reject or fails to send Reply.

temperature-sensing circuit removes power from the converter when the cabinet temperature reaches 55 degrees C (130 degrees F).

## SPECIFICATIONS

Converter specifications are as follows:

Height:	493 millimetres (19.4 inches)
Width:	269 millimetres (10.6 inches)
Depth:	787 millimetres (31.0 inches)
Mass:	45 kilograms (100 pounds)
Heat dissipation:	500 watts, maximum
Power requirements:	50/60 Hz, 120 volts, 5 amperes, maximum or 50/60 Hz, 220/230/240 volts, 2.5 amperes, maximum
Operating temperature range:	15 degrees C (59 degrees F) to 30 degrees C (86 degrees F)
Operating relative humidity range:	35 percent to 60 percent
Maximum operating altitude:	2000 metres (6600 feet) above sea level
Maximum length of CYBER channel input or output cable:	23 metres (75 feet)
Maximum total length of all 3000 channel data cables:	310 metres (1000 feet)
Maximum total length of all 3000 channel status cables:	310 metres (1000 feet)

## PHYSICAL DESCRIPTION

Figure 1-5 shows component locations within the converter cabinet. The front section of the cabinet contains a PARITY ENABLE switch, a POWER ON indicator, an air filter, and a logic chassis housing 34 printed circuit modules. The rear section of the cabinet contains a blower, various power supply components, connectors for CYBER and 3000 channels, and power controls.

The converter operates from 120-volt or 220/230/240-volt, 50/60-Hz power and provides a fuse for each dc power supply as well as the ac input. A

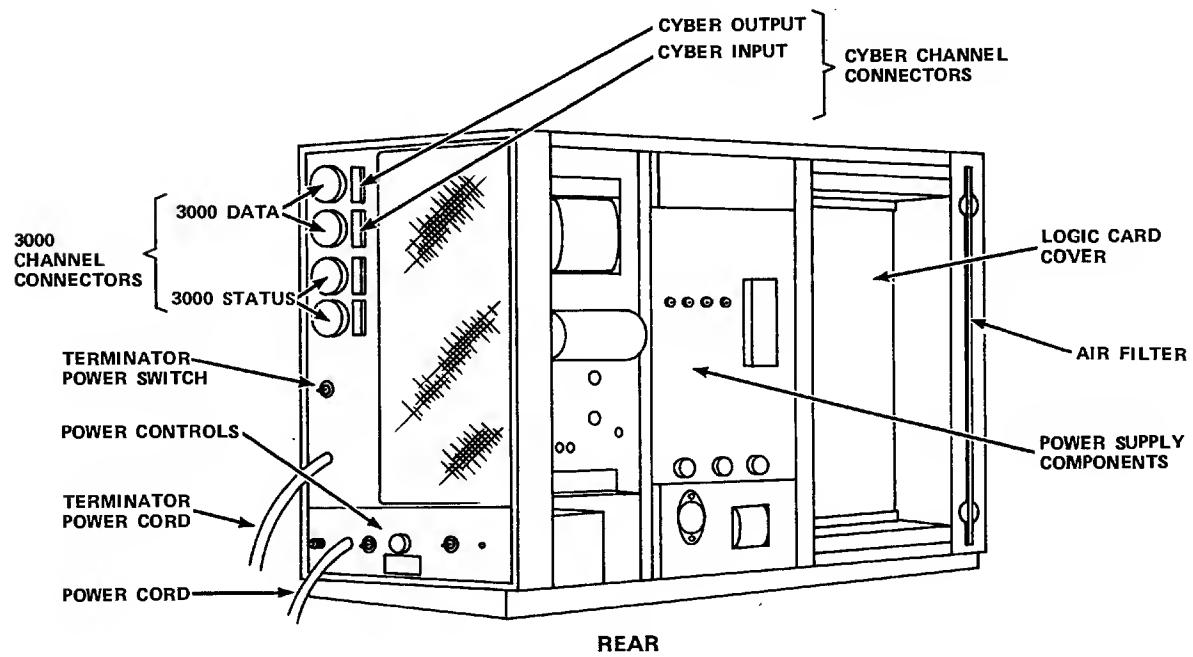
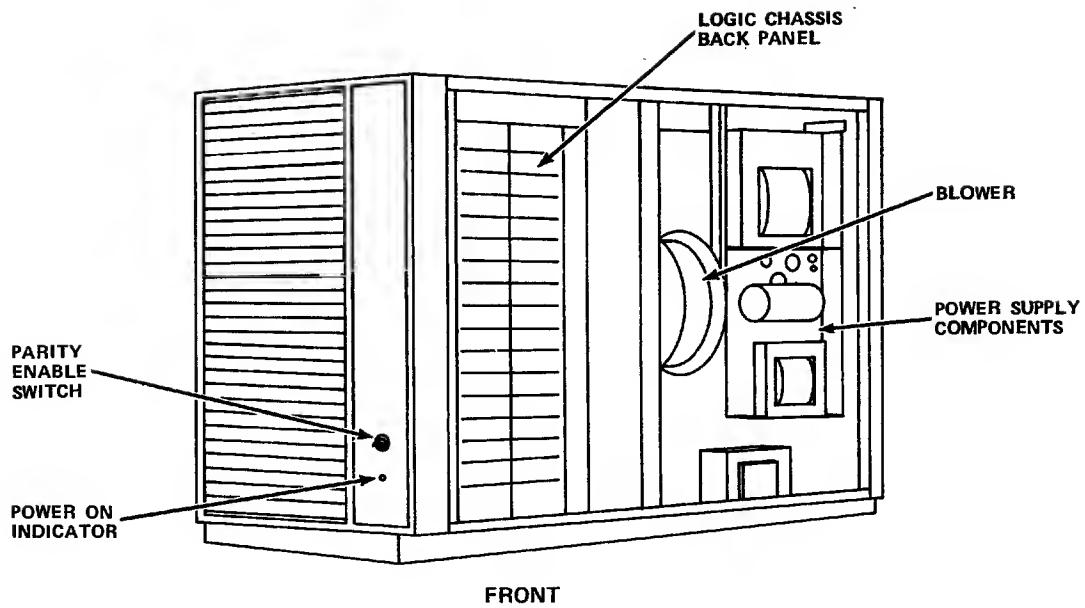


Figure 1-5. Component Locations

This section describes converter controls, power application, and function codes. The section also describes converter characteristics of interest to the peripheral processor (PP) programmer and provides programming examples.

## CONTROLS

Figure 2-1 shows the locations of converter controls. Table 2-1 describes each control.

## POWER APPLICATION

The POWER and TERM POWER switches on the rear panel control power application to the converter. To turn on the converter, place both switches in the ON position. To turn off the converter, place both switches in the OFF position.

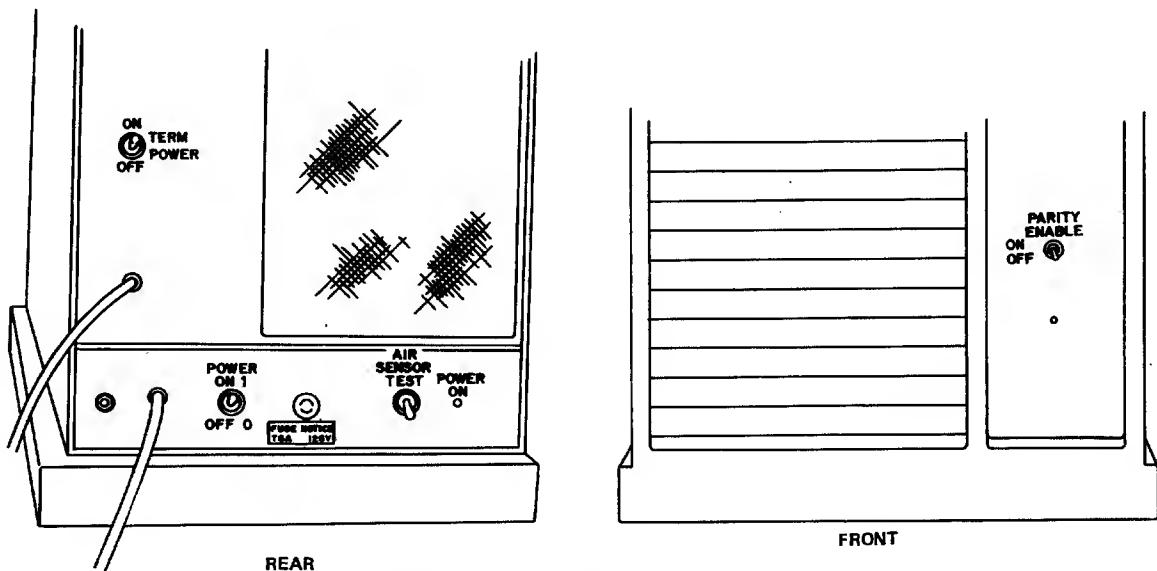


Figure 2-1. Converter Controls

Table 2-1. Control Descriptions

Panel	Control/Indicator	Description
Front	PARITY ENABLE switch	Enables CYBER channel parity checking. This switch should be OFF if the CYBER channel connected to the converter does not have parity.
Front	Unlabeled indicator	Indicates power is applied to converter.
Rear	TERM POWER switch	Applies 3000 channel terminator power to converter.
Rear	POWER switch	Applies power to converter.
Rear	6-ampere, 125-volt fuse	Protects converter from current overload.
Rear	AIR SENSOR TEST switch	Removes power from blower to permit testing of temperature protection circuit. This switch is for Customer Engineer use only, and should not be touched by others.
Rear	POWER ON indicator	Indicates power is applied to converter.

## PROGRAMMING CONVENTIONS

Before writing PP programs that communicate with the converter, the programmer should be familiar with the following programming conventions. Refer to figure 2-2 for converter status bit descriptions.

### INTERRUPTS

Most 3000 equipments have interrupt capabilities that allow them to notify the converter when certain conditions are present. An equipment provides interrupt status to the converter whether or not the equipment is connected. Refer to the appropriate 3000 equipment manuals for definitions of interrupt select function codes and interrupt conditions.

Converter status bits 3 through 10 reflect interrupt status for equipments 0 through 7, respectively. Once interrupt status sets for an equipment, it remains set until the PP sends a function to the equipment, until the PP issues a 1700-Master Clear function, or until a deadstart master clear occurs on the CYBER channel.

### LATENT PERIODS

After completing preliminary function activity, the PP initiates a data transfer operation by activating the CYBER channel. However, some 3000 equipments do not transfer the first data word until several milliseconds after the CYBER channel is activated. The PP can use this latent period to perform other

tasks. Refer to appropriate 3000 equipment manuals for latent period lengths.

### PARITY ERRORS

The converter checks parity on PP-to-converter transfers and the connected 3000 equipment checks parity on converter/3000 equipment transfers. Table 2-2 defines converter and 3000 equipment responses to each type of parity error condition.

The PP can clear 3000 equipment parity error status by performing a connect operation on the equipment. Converter parity error status bits clear after each 1200-Return Converter Status function. All parity error status bits clear after a 1700-Master Clear function (assuming no parity error occurs during the 1700 function) or after a deadstart master clear on the CYBER channel.

### DESELECT ON POWER FAULT

To reduce CYBER channel activity and thereby allow faster processing of power fault routines, the converter automatically deselects itself when Power Fault occurs on the 3000 channel. If a data transfer operation that enables inactive on abnormal EOP is in process, the converter deselects and then terminates the transfer by inactivating the CYBER channel.

The converter cannot be selected again until Power Fault drops.

Table 2-2. Converter Parity Error Responses

Channel	Operation	Response
CYBER	Function	Connect and Function signals to 3000 equipment are blocked. Converter does not inactivate CYBER channel (does not respond to function). If function decodes as 2000-Select Converter or 2100-Deselect Converter (or alternate select/deselect code) converter executes function. Otherwise, converter clears function register and executes no function.
CYBER	Output Data Transfer	Operation completes normally unless data word is a 3000 equipment connect or function code (see below). Converter generates CYBER Channel Parity Error status and CYBER or 3000 Channel Parity Error status.
3000	Connect	3000 equipment neither connects nor responds. Converter sets CYBER or 3000 Channel Parity Error status and generates Internal Reject status after 100 microseconds.
3000	Function	3000 equipment rejects function code. Converter generates External Reject status and CYBER or 3000 Channel Parity Error status.
3000	Data Transfer	Operation completes normally. Converter generates CYBER or 3000 Channel Parity Error status.

## FUNCTION CODES

Table 2-3 lists functions that apply to a selected converter. A converter becomes selected when a deadstart master clear occurs on the CYBER channel or when the PP issues a 2000-Select Converter function. Once a converter is selected, it is able to recognize any of the function codes listed in table 2-3. Conversely, an unselected converter is able to recognize only the 2000-Select Converter and 2100-Deselect Converter function codes. Refer to Programming Examples in this section for recommended methods of issuing function codes from a PP. The following paragraphs describe each function.

**OFF-ISSUE FUNCTION (ONE-WORD)**

This function causes the converter to issue function code 0fff to the connected 3000 equipment.

**1000-ISSUE CONNECT (TWO-WORD)**

This function causes the converter to accept the next data word from the PP and to issue the data word to the 3000 equipments as a connect code.

**1100-ISSUE FUNCTION (TWO-WORD)**

This function causes the converter to accept the next data word from the PP and to issue the data word to the connected 3000 equipment as a function code.

Table 2-3. Converter Function Summary

Code(s)	Function	Notes														
0fff	Issue Function (One-Word)	Allows 3000 equipment function codes 0000 through 0777 to be sent with a single word.														
1000	Issue Connect (Two-Word)	Second word contains any valid connect code.														
1100	Issue Function (Two-Word)	Second word contains any valid function code.														
1200	Return Converter Status	Refer to figure 2-1 for converter status word format.														
1300	Return Equipment Status	Refer to appropriate 3000 equipment manuals for equipment status code descriptions.														
14in	Input: Inactive on EOR	For codes 14in, 15in, and 16in, i and n are defined as follows:														
15in	Input															
16in	Output	<table> <thead> <tr> <th><u>i</u></th> <th><u>Definition</u></th> </tr> </thead> <tbody> <tr> <td>0</td> <td>No additional inactive enabled.</td> </tr> <tr> <td>4</td> <td>Enable inactive on abnormal EOP status from 3000 equipment.</td> </tr> <tr> <td>6</td> <td>Enable inactive upon receipt of Interrupt Override signal from 3000 equipment.</td> </tr> </tbody> </table> <table> <thead> <tr> <th><u>n</u></th> <th><u>Definition</u></th> </tr> </thead> <tbody> <tr> <td>0</td> <td>Enable BCD conversion.</td> </tr> <tr> <td>1</td> <td>Negate BCD conversion.</td> </tr> </tbody> </table>	<u>i</u>	<u>Definition</u>	0	No additional inactive enabled.	4	Enable inactive on abnormal EOP status from 3000 equipment.	6	Enable inactive upon receipt of Interrupt Override signal from 3000 equipment.	<u>n</u>	<u>Definition</u>	0	Enable BCD conversion.	1	Negate BCD conversion.
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0	No additional inactive enabled.															
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6	Enable inactive upon receipt of Interrupt Override signal from 3000 equipment.															
<u>n</u>	<u>Definition</u>															
0	Enable BCD conversion.															
1	Negate BCD conversion.															
1700	Master Clear	Clears converter and all 3000 equipments.														
2000 2100	Select Converter Deselect Converter	Codes 2000 and 2100 are not normally used, because computer deadstart automatically selects converter.														
4ccc-7ccc	Issue Connect (One-Word)	Allows valid 3000 equipment connect codes greater than 4000 to be sent with a single word.														

## 1200-RETURN CONVERTER STATUS

This function causes the converter to return one word of status to the PP the next time the PP activates the CYBER channel. Figure 2-2 shows the converter status word format.

## 1300-RETURN EQUIPMENT STATUS

This function causes the converter to return one word of 3000 equipment status to the PP the next time the PP activates the CYBER channel. Refer to the appropriate 3000 equipment manuals for status code descriptions.

## 14in/15in/16in-TRANSFER DATA

Each of these functions conditions the converter for a 3000 equipment data transfer operation and specifies whether the converter should terminate the operation (by inactivating the CYBER channel) when the 3000 equipment detects end-of-record (EOR). The i and n digits in each input/output function code specify additional CYBER channel inactivation conditions and binary-coded decimal (BCD) conversion as follows:

<u>i</u>	<u>Description</u>
0	Disables any additional CYBER channel inactivation. However, if the 3000 equipment sends Interrupt Override, the converter continues to send Fulls or Empties to the PP until the PP inactivates the CYBER channel.
4	Enables CYBER channel inactivation when converter detects abnormal end-of-operation (EOP) status from the connected 3000 equipment. Abnormal end-of-operation must be selected in the 3000 equipment.

<u>i</u>	<u>Description</u>
6	Enables CYBER channel inactivation when the converter receives an Interrupt Override signal from the connected 3000 equipment. Interrupt on abnormal end-of-operation need not be selected in the 3000 equipment.

<u>n</u>	<u>Description</u>
0	Enables internal-to-external BCD conversion in the connected 3000 equipment.
1	Disables internal-to-external BCD conversion in the connected 3000 equipment.

Refer to Programming Examples in this section for details concerning the use of input/output codes.

### 14in-Input: Inactive on EOR

This function conditions the converter for a 3000 equipment-to-PP data transfer and enables the converter to terminate the input operation (by inactivating the CYBER channel) upon receipt of end-of-record from the 3000 equipment. The PP may terminate the input operation at any time by inactivating the CYBER channel. Digits i and n in the function code specify additional CYBER channel inactivation conditions and BCD conversion as previously described.

### 15in-Input

This function conditions the converter for a 3000 equipment-to-PP data transfer and enables normal termination of the input operation to occur only when the PP inactivates the CYBER channel. Digits i and n in the function code specify additional CYBER channel inactivation conditions and BCD conversion as previously described.

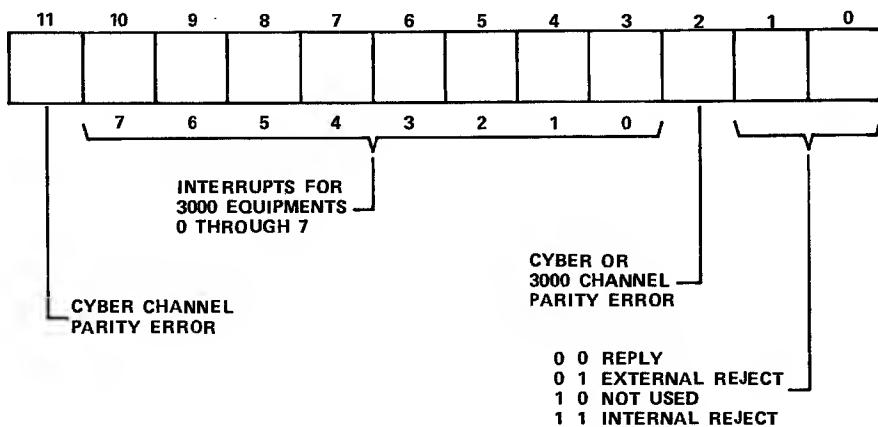


Figure 2-2. Converter Status Word Format

## 16in-Output

This function conditions the converter for a PP-to-3000 equipment data transfer and enables normal termination of the output operation to occur only when the PP inactivates the CYBER channel. Digits i and n in the function code specify additional CYBER channel inactivation conditions and BCD conversion as previously described.

## 1700-MASTER CLEAR

This function clears the converter and all 3000 equipments attached to the converter.

## 2000-SELECT CONVERTER

This function allows the converter to recognize all other converter function codes.

## 2100-DESELECT CONVERTER

This function prevents the converter from recognizing any function except 2000-Select Converter and 2100-Deselect Converter.

## 4ccc-7ccc-ISSUE CONNECT (ONE-WORD)

This function causes the converter to issue connect code eccc (where e is a digit from 4 through 7) to the 3000 equipments as a connect code.

## PROGRAMMING EXAMPLES

Converter data transfer operations usually involve the following steps:

1. Select the converter (if it is not already selected). This makes the converter and attached 3000 equipment available to the PP.
2. Connect one of the 3000 equipments. This cancels any previous 3000 equipment connection and makes one of the 3000 equipments available for function and data transfer operations.
3. Send a function to the connected 3000 equipment. This prepares the 3000 equipment for a data transfer operation.

4. Perform the data transfer operation set up in the previous step. The PP does this by issuing a 14in/15in/16in-Transfer Data function to the converter, and then executing an input or output instruction sequence.

The following sequences indicate PP instructions that can be used to accomplish the steps previously listed.

## SELECT CONVERTER

1. Use an AJM instruction to wait for the CYBER channel to become inactive.
2. Use an FAN or FNC instruction to send a 2000-Select Converter function to the converter. Use an AJM instruction to wait for the converter to deactivate the CYBER channel.

## ISSUE ONE-WORD CONNECT

1. Use an FAN or FNC instruction to send an eccc-Issue Connect (One-Word) function to the converter. Use an AJM instruction to wait for the converter to deactivate the CYBER channel.
2. Use an FAN or FNC instruction to send a 1200-Return Converter Status function to the converter. Use an AJM instruction to wait for the converter to deactivate the CYBER channel.
3. Use ACN, IAN, and DCN instructions to activate the CYBER channel, input the status word, and deactivate the CYBER channel, respectively. Check the status word and exit to an error routine if the 3000 equipment rejected the connect attempt.

## ISSUE TWO-WORD CONNECT

1. Use an FAN or FNC instruction to send a 1000-Issue Connect (Two-Word) function to the converter. Use an AJM instruction to wait for the converter to deactivate the CYBER channel.
2. Use ACN and OAM or OAN instructions to activate the CYBER channel and to output the 3000 equipment connect code, respectively.
3. Use FJM and DCN instructions to wait for the CYBER channel to become empty and to deactivate the CYBER channel, respectively.

4. Use an FAN or FNC instruction to send a 1200-Return Converter Status function to the converter. Use an AJM instruction to wait for the converter to inactivate the CYBER channel.
5. Use ACN, IAN, and DCN instructions to activate the CYBER channel, input the status word, and inactivate the CYBER channel, respectively. Check the status word and exit to an error routine if the 3000 equipment rejected the connect attempt.

#### ISSUE ONE-WORD FUNCTION

1. Use an FAN or FNC instruction to send a 0fff-Issue Function (One-Word) function to the converter. Use an AJM instruction to wait for the converter to inactivate the CYBER channel.
2. Use an FAN or FNC instruction to send a 1200-Return Converter Status function to the converter. Use an AJM instruction to wait for the converter to inactivate the CYBER channel.
3. Use ACN, IAN, and DCN instructions to activate the CYBER channel, input the status word, and inactivate the CYBER channel, respectively. Check the status word and exit to an error routine if the 3000 equipment rejected the function or if a parity error occurred.

#### ISSUE TWO-WORD FUNCTION

1. Use an FAN or FNC instruction to send a 1100-Issue Function (Two-Word) function to the converter. Use an AJM instruction to wait for the converter to inactivate the CYBER channel.
2. Use ACN and OAM or OAN instructions to activate the CYBER channel and output the 3000 equipment function code, respectively.
3. Use FJM and DCN instructions to wait for the CYBER channel to become empty and to inactivate the CYBER channel, respectively.
4. Use an FAN or FNC instruction to send a 1200-Return Converter Status function to the converter. Use an AJM instruction to wait for the converter to inactivate the CYBER channel.
5. Use ACN, IAN, and DCN instructions to activate the CYBER channel, input the status word, and inactivate the CYBER channel, respectively. Check the status word and exit to an error routine if the 3000 equipment rejected the function or if a parity error occurred.

#### PERFORM INPUT DATA TRANSFER

1. Select the converter (if necessary) and issue a connect and a function to the desired 3000 equipment.
2. Use an FAN or FNC instruction to send a 15in-Input function to the converter. Use an AJM instruction to wait for the converter to inactivate the CYBER channel.
3. Use ACN, IAN, and DCN instructions to activate the CYBER channel, input the data block, and inactivate the CYBER channel, respectively.
4. Use an FAN or FNC instruction to send a 1200-Return Converter Status function to the converter. Use an AJM instruction to wait for the converter to inactivate the CYBER channel.
5. Use ACN, IAN, and DCN instructions to activate the CYBER channel, input the status word, and inactivate the CYBER channel, respectively. Check the status word for parity errors and 3000 equipment interrupts. Exit to an error routine if a parity error occurred.
6. Use an FAN or FNC instruction to send a 1300-Return Equipment Status function to the converter. Use an AJM instruction to wait for the converter to inactivate the CYBER channel.
7. Use ACN, IAN, and DCN instructions to activate the CYBER channel, input the status word, and inactivate the CYBER channel, respectively. Check the status word for equipment error conditions. Exit to an error routine if an error occurred.

#### PERFORM OUTPUT DATA TRANSFER

1. Select the converter (if necessary) and issue a connect and a function to the desired 3000 equipment.
2. Use an FAN or FNC instruction to send a 16in-Output function to the converter. Use an AJM instruction to wait for the converter to inactivate the CYBER channel.
3. Use ACN, OAM or OAN, and DCN instructions to activate the CYBER channel, output the data block, and inactivate the CYBER channel, respectively.
4. Use an FAN or FNC instruction to send a 1200-Return Converter Status function to the converter. Use an AJM instruction to wait for the converter to inactivate the CYBER channel.

5. Use ACN, IAN, and DCN instructions to activate the CYBER channel, input the status word, and deactivate the CYBER channel, respectively. Check the status word for parity errors and 3000 equipment interrupts. Exit to an error routine if a parity error occurred.
6. Use an FAN or FNC instruction to send a 1300-Return Equipment Status function to the converter. Use an AJM instruction to wait for the converter to deactivate the CYBER channel.
7. Use ACN, IAN, and DCN instructions to activate the CYBER channel, input the status word, and deactivate the CYBER channel, respectively. Check the status word for equipment error

conditions. Exit to an error routine if an error occurred.

#### **DESELECT CONVERTER**

1. Use an AJM instruction to wait for the CYBER channel to become inactive.
2. Use an FAN or FNC instruction to send a 2100-Deselect Converter function to the converter. Use an AJM instruction to wait for the converter to deactivate the CYBER channel.



## COMMENT SHEET

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